

**BELLCOMM, INC.**

1100 Seventeenth Street, N.W. Washington, D.C. 20036

**SUBJECT:** Trip Report - Nineteenth AAP  
Flight Operations Plan Meeting  
MSC, July 26, 1968 - Case 610

**DATE:** August 15, 1968

**FROM:** B. H. Crane

MEMORANDUM FOR FILE

Presentations at the nineteenth AAP Flight Operations Plan (FOP) Meeting covered the status of studies on: (1) the need for a SM battery pack on AAP missions, (2) alternatives regarding night launch or landing on AAP-1/AAP-2, and (3) ATM antenna coverage patterns for AAP-3/AAP-4. Work is also progressing on system operating constraints for AAP modules; a preliminary list is now available for the LM-A. Following is a brief summary of these topics and some of the other items discussed at the meeting, which was held at MSC on July 26, 1968.

1. SM Battery Pack

The Flight Control Division has studied the anticipated effect of the SM battery pack on mission rules related to fuel-cell failures. Under the assumptions of the study, AAP missions could probably be continued with a failure of one fuel cell, but availability of water becomes a problem after a failure of two fuel cells using current ground rules. Retention of the SM batteries generally provides additional time for cluster deactivation, data retrieval, and preparation for reentry. North American Rockwell was asked to determine whether a longer battery lifetime can be expected after landing in cold water at a high latitude, which might occur on a high inclination CM-SM/ATM mission.

2. Night Launch, Night Landing, or New Landing Sites for AAP-1/AAP-2

In assembling the data for the Preliminary Baseline Reference Mission (PBRM), it was brought to the attention of the FOP meeting that AAP-1/AAP-2 cannot be flown for 28 days and still meet requirements for launching and landing in daylight, using the present recovery zones. A mission of about twenty-four days could be planned to meet these requirements. A study is currently underway to consider the problems that would be encountered if pre-launch operations, monitoring of launch, launch aborts, retro-fire, landing, crew egress, or recovery had to be done at night. The effect of relocating planned landing areas is also being analyzed for both nominal and contingency landings.

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### 3. ATM Antenna Patterns

MSFC presented test data on antenna coverage for the dipole antennas on the ATM solar arrays. As one example, telemetry transmissions for the aft antenna fall below a 10 db signal-to-noise ratio in 15% of the possible directions as compared to 25% for the forward antenna. Additional data is available in the minutes of the meeting. MSFC plans to compute the station coverage for a typical mission to determine whether intermittent shadowing during station passes is a problem with the selected antenna configuration. With respect to a decoupled CM-SM/ATM mission, MSFC expressed the opinion that blocking would be considerably less without the OWS and OWS solar arrays.

### 4. System Operating Constraints

Additions to the current list of Airlock constraints by Mc Donnell Douglas include a requirement that T017 and T021 be deployed as soon as possible after launch, because the stowed position blocks the radiators. Grumman submitted about sixty preliminary system operating constraints for the LM-A, based primarily on the LM-A Requirements Document and Apollo data on RCS firings. MSFC is preparing a preliminary list for the ATM, and North American Rockwell is to begin assembling CM/SM constraints after their PRR.

### 5. RCS Propellant for CMG Dumping in a CM-SM/ATM Mission

Although MSFC has not done detailed calculations on the SM RCS propellant required for CMG spin-up and momentum dumping during a decoupled mission, they stated that presently baselined quantities would probably be adequate. High-inclination elliptical orbits were not considered in this estimate. The major difference in a decoupled mission is that the SM RCS is used instead of the WACS to maintain a nominal attitude to within  $\pm 10^\circ$  in all axes during CMG spin-up.

### 6. Baseline Reference Mission

A steering committee is being formed to plan the steps that must be taken to arrive at a Baseline Reference Mission for AAP, using the PBRM as a starting point. AAPO will chair these meetings with representatives from FCOD, FOD, MSFC, and KSC.



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